

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

ERNST REICHWEIN and
JOSEPH G. WHITE

Examiner:

Serial No.

Art Unit:

Filed: Herewith

For: INTERACTIVE EQUIPMENT
DIAGNOSTIC AND ORDER
WRITING SYSTEM

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

Please amend the above-identified patent application as follows. The changes are located on the pages marked "Version with Markings to Show Changes Made."

IN THE DRAWINGS:

With the approval of the draftsperson, please replace Figures 1-33 with the new Figures 1-33 submitted herewith. Applicants respectfully submit that the new drawings comprise formal drawings.

IN THE TITLE:

Please replace the title as follows:

-- INTERACTIVE SYMPTOMATIC RECORDING SYSTEM
AND METHODS --.

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 1, lines 4 through 15, with the following paragraph:

The present invention relates generally to interactive computerized systems and methods for obtaining and processing information. More particularly, the present invention pertains to an interactive system and method for receiving information regarding a customer, the equipment, such as an automobile, a tractor and/or trailer, a fork lift, cherry picker or front loader, and the symptomatic problems that prompt the need for service or repairs, and the processing of this information to generate work and parts orders for the customer, the supplier(s), and service personal. The invention further pertains to the optional transmission of work completion data to accounting and/or quality control subsystems. While the invention is usable for servicing a variety of equipment, it will be primarily described here in terms of automobiles because the description of this example addresses most, if not all, of the problems relative to a large repair shop for such equipment.

Please replace the paragraph beginning at page 2, lines 10 through 22 and page 3, lines 1 through 2, with the following paragraphs:

The present invention provides an interactive, user-friendly symptomatic recording system for the driver or other equipment deliverer. The customer can answer basic Menu-driven queries and/or prompts and the system will prepare and transmit to the repair center a preliminary symptomatic report including the symptom or symptoms that prompted the need for repair as well as the frequency of occurrence. For example the problem could be hard starting in the cold that has never happened before. The system is particularly useful for employment outside the normal operating hours of the repair facility.

Representative of the art is;

U.S. Patent No. 5,214,582, issued to Gray, teaches interactive diagnostic systems and methods for automotive vehicles of the type having networks of sensors and actuators for sensing and actuating various functions in the vehicle and onboard computers for monitoring sensors and controlling the actuators. An external computer is used to control selected actuators independent of the onboard computer and for simulating operation of selected sensors. At the same time, the electronic data entering and exiting the onboard computer is monitored and analyzed by the external computer for trouble shooting purposes.

Please replace the paragraph beginning at page 5, lines 5 through 7, with the following paragraph:

One aspect of the present equipment service invention is to provide an efficient system and process for obtaining, recording and utilizing appropriate information about a vehicle and why it requires service from a customer.

Please replace the paragraph beginning at page 6, lines 1 through 12, with the following paragraphs:

Optionally, an input mechanism can be provided to transmit data upon completion of the work to an accounting module or subsystem to facilitate preparation of the bill and notification of the customer by the accounting department. Such data can also be transmitted to a quality control subsystem.

Further input and display mechanisms are provided for the mechanic, service representative, or lay person using the system to check and provide status information about the automobile's current service program. A data bank is provided to receive and maintain current status information on work assignments being performed for customers and cars. Interactive communication units are provided to originate and receive calls to and from customers regarding the status of the work assignments on their cars.

Interactive communication units are also provided to initiate and execute orders for service, supplies, and parts from dealer stock or external providers.

Please replace the paragraph beginning at page 7, lines 1 through 3, with the following paragraph:

Further, an interactive computerized process is provided for receiving customer inputs for compiling and summarizing those inputs, and developing work orders for service personnel and non-lay person technicians identifying the symptomatic problems that prompted the lay person to seek automobile repair and maintenance. This is accomplished by steps including!

Please replace the paragraph beginning at page 10, lines 12 through 22, with the following paragraph:

FIGS. 1 and 2 provide an overview of the systems and methods of the invention. FIG. 1 is a system overview of the invention. A customer brings an automobile to the repair center where customer interacts with customer interview terminal screen 10. This console can include a portable personal computer or, at least, a freestanding terminal serving a master computer. It comprises input means and interactive display means, preferably a touch-active CRT screen such as disclosed in U.S. Patents Nos. 4,449,186; 5,404,443; 5,488,575- 5,499,707; 5,537,315 and 5,539,429 incorporated herein by reference. Such touch-active screens preferably incorporate audio output means, as disclosed in U.S. Patent No. 4,449,186. The system is designed so that the hardware and software cooperate to provide convenient means for the customer to provide the necessary symptomatic information.

Please replace the paragraph beginning at page 11, lines 1 through 22, page 12, lines 1 through 22, and page 13, lines 1 through 5, with the following paragraphs:

Preferably, most information will be provided via the touch-active screen in response to a menu-driven series of queries or prompts. Some of the input information (i.e., vehicle and customer ID, credit card payment information, and the like) can be provided by inserting to the card reader 20 a credit card, or other identity card issued by the repair center to minimize effort on the part of the customer and errors as well. Such cards can be used to unlock and provide access to the console and other input devices to minimize vandalism or other unauthorized activities. Alternatively, systems can be used which automatically sense the vehicle's ID and/or the condition of the vehicle systems such as, for example, an optical/magnetic reader 40, see e.g., U.S. Patent No. 5,058,044. To augment the preferred touch-active screens, a standard or simplified alphanumeric keyboard 30 can be provided, and optionally provisions can be made for the customer to dictate into the input system using devices such as the voice-activated system disclosed in U.S. Patent no. 5,586,037.

In addition to the Customer's direct input of ID data, observed symptoms, and requests at this intake transaction, customer may be assisted by a service advisor or other representative of the repair center. Such representatives may enter information at the console 10, and/or use a hand-held device such as disclosed above. Optionally, readings may be taken from the vehicle's onboard computer 50 at this point using a hand-held unit or other computerized monitor. In this way, the error codes from the onboard computer can be read, analyzed, and considered in writing up the service order. This will normally be available only if the customer is willing to wait and there is a repair center representative available to take the readings unless an automatic sensor system is used as in U.S. Patent No. 5,557,268. A

service advisor may introduce information into the system via console 10, either during the customer's intake transaction or thereafter. Preferably, the service advisor will employ a hand-held unit incorporating the functions of console 10.

The console displays menus, queries, prompts and input/output data on the CRT screen, and upon command or completion of the transaction prints out materials via printer 90, or other similar printers that could be attached to the system at one of the input devices or networked to computing device 70, for the customer's use.

The information inputs all enter a computing device 70 that could include a programmed computer, as shown, having a central processing unit (CPU), a device having firmware embedded into microchips, a general personal computer having specialized application programming, etc. component. The information entered into the computing device 70 is analyzed, summarized, compiled, and correlated. The system may query the customer further to develop the input information fully before closing the transaction. When the initial information is obtained, the system prepares a service order that includes a standardized reporting of the symptomatic problems that prompted the lay person to seek repairs. The present invention could be combined with a diagnostic service program that outputs a service need in the order, if the needed service and/or repairs are clear. More typically, however, more information is needed to determine the service required, therefore, the system can print out and display a standardized summary of the symptomatic problems containing queries for the mechanic and/or service advisor to analyze. The service mission is subject to change after readings have been taken from the vehicle's onboard computer.

A finished service order will be transmitted to mechanic, service representative, technician, or other professional via printer 90 and/or console, which displays the order on a CRT screen. Using similar input means to those

described for console 10, the mechanic can submit information to modify the service order, query the service advisor as to what work is approved, and advise the system when the job is completed or delayed. Such inputs will be transmitted to computing device 70 which stores and processes them. Events including job completion or delay are transmitted via suitable communications media, such as the telephone, facsimile, or e-mail, to the customer using customer notification programs. Additionally, in the process of the job, the computing device 70 can be used to optionally identify and order materials, spare parts and the like for the service using ordering program.

Please replace the paragraph beginning at page 14, lines 1 through 22, and page 15, lines 1 through 11, with the following paragraphs:

(4), Brakes (5), Steering/suspension (6) Power accessories/electrical (7), and Other services (8) subcategories. These categories are supplemented (See Fig. 33) for vehicles more complex than automobiles, e.g., a Peterbilt truck, and vehicle-based equipment, e.g., a cherry picker and a front loader. Each of these menu choices leads to subroutines containing multiple menu choices to guide the customer through an interrogation process which will identify the symptomatic problems to be corrected and/or routine services to be performed. Exemplary flow diagrams for these subcategories are provided in subsequent figures discussed below. Upon completion of any of the subroutines 1 through 8, the display shifts to a "General Questions" subroutine 130 which queries the customer as to how often the problem occurs and similar questions. After responding to these queries, the customer is queried as to whether there are additional vehicle problems 135; if "yes", the program reverts to the main menu for further choices. Selection of the "other services" menu 140 provides options for choosing various maintenance services as well as a "Help" option which refers the customer to the service advisor as shown at 145.

Upon completion of the interrogation via the categorical subroutines, the customer is automatically transferred to "Additional Services" subroutine 150, which offers further choices discussed below for routine service operations and the like. Once the customer exits this menu, customer is transferred to subroutine 155 which uses Boolean and other processing logic to provide a compilation of the symptoms and requested service items and displays the compilation along with a menu of additional accessories or services which can be purchased. Following this, subroutine 160 provides a cost estimate of any requested maintenance services, and subroutine 165 provides a cost estimate of repair costs and pickup time. The repair/work order is presented by subroutine 170, and the customer's electronic signature is captured. On signature of the repair order, instructions for leaving the key(s) in a secure depository are shown at 173. Subroutine 175 then queries whether the customer will wait for the vehicle, drop it off, or request a loaner vehicle. Subroutine 175 also queries the customer's requests with regard to the disposition of the used parts. Finally, the finished repair estimate is displayed and printed out for both the customer, service advisor and the mechanic, technician, or other professional service provider at 180.

Please replace the paragraph beginning at page 16, lines 1 through 10, with the following paragraph:

services" menu 360. Since the customer chooses no additional services, the system compiles and summarizes the symptoms and any requested maintenance services at 365 and presents the customer with a menu of additional merchandise and services which can be purchased. Subroutine 370 presents the customer with the estimated maintenance costs (if any), and subroutine 375 presents a statement of estimated repair costs and pickup time. The system then captures the customer's signature 380, queries as to whether customer will wait or drop off the vehicle 385 with the repair organization, whether a loaner is required, and whether parts are to be returned as shown in

block 385. Finally, the finished repair order is displayed and printed for both customer and mechanic at 390. The system resets for the next customer at 395.

Please replace the paragraphs beginning at page 17, lines 1 through 17, with the following paragraphs:

FIG. 5 illustrates the menu choices for "Noise/vibrations" (Category 2). The initial menu allows the customer to select noises or vibrations alone or a combination of both. Whatever the choice, the customer will be queried as to what the nature of the symptoms are, when they occur and where the symptom occurs. Input from the service computer can be provided to assist in the analysis. Finally, the customer is queried as to "how often" the symptoms occur. At this point, the computer advances to "Additional Vehicles Problems" 135.

FIG. 6 illustrates menu choices for a "Automatic/manual/4-wheel drive" transmission check (Category 3). The initial menu requires selection as to automatic or manual transmissions or the 4-wheel drive. Once a selection is made, the customer is queried as to the nature of the symptoms and when they occur. After these questions are answered, the customer is queried as to how often the symptoms occur. After all these questions are answered for a subcategory, the customer is queried as to whether there are problems in another subcategory. If not, the system moves to the closing sequence. If the customer indicates that there are problems in another subcategory, (e.g., problems with the 4-wheel drive in addition to the transmission), the computer returns to the main menu 125 for another selection.

Please replace the paragraphs beginning at page 18, lines 10 through 16, with the following paragraphs:

FIG. 9 illustrates the menu choices for "Steering/Suspension" (Category 6). The initial menu choices are for steering or suspension problems, and after making a selection, the customer is called upon to describe the nature of the symptoms, when they occur, and how often they occur. After these questions are answered, the customer is queried whether there are any symptoms in the other subcategory (e.g., suspension in addition to steering). If not, customer is returned to the main menu or passed through the closing sequence.

Please replace the paragraphs beginning at page 19, lines 20 through 22, and page 20, lines 1 through 4, with the following paragraphs:

FIGS. 12A and 12B illustrate computer screens which relate to information obtained by optic, magnetic or rf (including microwave) scanning. As shown in FIGS. 12B and 12C, information may also be input through touch screen technology or other input means, not specifically shown. FIGS. 12C-12D illustrate screens which enable the customer to input personal information. FIGS. 12E and 12F are illustrative of screens enabling the customer to input "Mileage" by pressing a "change" designator to bring up a numeric keypad. FIG. 12G similarly enables the customer to enter a telephone number for contact during the period the car is in the shop. An illustrative keypad screen is omitted.

Please replace the paragraphs beginning at page 20, lines 8 through 13, with the following paragraph:

FIGS. 14A to 14D illustrate computer monitor screens for the "Category 1" program. FIG. 14A identifies the category and asks for the selection of "Symptoms." FIG. 14B illustrates a screen for "Symptoms when

starting." FIG. 14C illustrates the screen for "When do you notice it", i.e., the questions about the nature and frequency of the symptoms. FIG 14D illustrates the screen querying the customer regarding "Symptoms when driving".

Please replace the paragraphs beginning at page 22, lines 21 through 22 and page 23, lines 1 through 17, with the following paragraphs:

FIGS. 21A to 21S illustrate selected computer screens for the "Other services" program. FIG. 21A illustrates a screen for "Other services available" offering menu choices for scheduled and unscheduled maintenance, vehicle exterior and interior, special order parts and recall notices, new- or used-car internal and general symptoms. FIG. 21B illustrates a screen for "Scheduled maintenance" and FIG. 21C illustrates a screen for "Unscheduled maintenance." FIG. 21D illustrates a screen for "Vehicle exterior" subcategory including questions regarding the area(s) in which the problem is occurring. FIGS. 21E – 21I provide problem location selections. FIG. 21 E illustrates a screen requesting information on the problem location. The FIG. 21 F illustrates a screen for locating a problem on the vehicle exterior via a diagram. FIG. 21G illustrates a computer screen for the "Vehicle interior" subcategory, including questions regarding the area where the problem is occurring. FIG. 21 H illustrates a screen for the "Problem location" subcategory of "Vehicle interior lighting". FIG. 21I is illustrative of a screen for locating problems via a diagram. FIG. 21J illustrates a screen for describing the problem. FIG 21 K illustrates a screen for information regarding a special order or recall notice. FIG. 21L illustrates the screen for a "new car" or used car" internal repair order. FIGS. 21M - 21S illustrate screens for identifying things the customer sees, hears, smells and feels under the "help" category 140 of FIG. 2 and asks "When" and "Where."

Please replace the paragraphs beginning at page 25, lines 6 through 20, with the following paragraph:

Input mechanisms can include conventional keyboards and/or keypads, interactive touch screens, and screens with icons, such as graphical user interfaces, that are responsive to input devices, such as a "mouse", optical and magnetic readers, and data input ports. Preferably the input mechanisms include touch-active display screens as discussed in detail below. Such screens permit interaction between a user and the computer in response to the users touching the screen with an object such as a finger or a pointing device. As disclosed in U.S. Patent No. 5,537,315, such pointing devices can include a light pen, sonic pen, voltage pencil, stick, or wand. Other input mechanisms to the system, if not directly to the computer, will include smart card devices, such as conventional credit card readers, for receiving data about the customer and/or vehicle to be serviced, plus payment information such as credit card numbers. One suitable credit card reader is disclosed in U.S. Patent No. 4,449,186, column 1. Optionally, the input mechanisms can include a voice-activated system, such as a digitized voice recognition system for receiving user input, such as those pioneered by Dragon Systems, Inc., San Rafael, California.

Please replace the paragraphs beginning at page 28, lines 1 through 3, with the following paragraph:

previous categories and will provide feedback subroutines necessary to handle vehicles other than automobiles and mechanical equipment for grading, lifting, moving, etc., various items and/or products.

IN THE CLAIMS:

Please (1) re-number the second-numbered claim 14 on page 32 as claim 15, re-number claims 15 and 16 on page 33 as claims 17 and 18, (3)

cancel claims 1-17 without disclaimer or prejudice, and (4) then add the following new claims 18 to 54.

--18. An interactive symptomatic recording device for compiling symptoms relating to a product as sensed by a lay person, and for generating a chart of symptoms for use by a service provider, the recording device comprising:

5 a query generator;

a presentation device for receiving an initial query from the query generator and for presenting the initial query to the lay person;

10 the presentation device also receiving at least one next query generated by the query generator and presenting the at least next query to the lay person;

an input device allowing the lay person to respond to queries presented to the lay person by the presentation device;

a compiler coupled to the input device to compile responses received from the lay person; and

15 an output device coupled to the compiler to prepare a chart of symptoms of the product based on the compiled responses, the chart for use by a service provider;

20 the chart providing sufficient information so that the lay person generally does not need to further communicate with the service provider when leaving the product with the service provider;

wherein the query generator is coupled to the presentation device to generate the initial query and to send the initial query to the presentation device;

25 wherein the query generator is coupled to the input device to receive responses from the input device and to generate at least one next query based on received responses; and

 wherein at least one of the next queries is related to a symptom sensed by the lay person.

19. A recording device according to claim 18 wherein the product is one of a group consisting of a mechanical device, an electrical device, an electro-mechanical device, an optical device, an automotive device, and an animal.

20. A recording device according to claim 18 wherein the product is a human animal and the symptoms relate to medical conditions.

21. A recording device according to claim 18 wherein the presentation device includes a visual display.

22. A recording device according to claim 21 wherein the presentation device is a hand held computing device.

23. A recording device according to claim 21 wherein the presentation device is a personal computer.

24. A recording device according to claim 18 wherein the input device includes a touch activated screen.

25. A recording device according to claim 18 wherein the input device includes a keyboard.

26. A recording device according to claim 25 wherein the keyboard is an alpha-numeric keyboard.

27. A recording device according to claim 25 wherein the keyboard is a numeric keyboard.

28. A recording device according to claim 18 wherein the input device includes a scanning device.

29. A recording device according to claim 28 wherein the scanning device is an electro-optical scanning device.

30. A recording device according to claim 28 wherein the scanning device is an optical scanning device.

31. A recording device according to claim 28 wherein the scanning device is an electrical scanning device.

32. A recording device according to claim 28 wherein the scanning device is a radio frequency scanning device.

33. A recording device according to claim 28 wherein the scanning device is a magnetic scanning device.

34. A recording device according to claim 28 wherein the scanning device is an electro-magnetic scanning device.

35. A recording device according to claim 18 wherein the query generator generates menu based queries that categorize symptoms of the product based upon symptoms that the lay person senses using at least one of the five senses.

36. A recording device according to claim 35 wherein the query generator categorizes symptoms based upon when symptoms occur as the product is observed by the lay person.

37. A recording device according to claim 35 wherein the query generator categorizes symptoms based upon where symptoms occur as the product is observed by the lay person.

38. A recording device according to claim 35 wherein the query generator categorizes symptoms based upon how often the symptoms occur as the product is observed or operated by the lay person.

39. A recording device according to claim 35 wherein the query generator categorizes symptoms based upon when, where, and how often symptoms occur as the product is observed or operated by the lay person.

40. A recording device according to claim 18 wherein the query generator generates at least one pictorial representation of the product for presentation to the lay person by the presentation device.

41. A recording device according to claim 40 wherein the input device allows the lay person to respond to at least one query by touching the at least one pictorial representation of the product.

42. A recording device according to claim 18 wherein the output device includes a printer.

43. A recording device according to claim 18 wherein the output device includes a monitor.

44. A recording device according to claim 18 wherein the input device includes a printer that outputs instructions to the lay person regarding deposition of the product by the service provider, and outputs instructions to the lay person regarding the product.

45. A recording device according to claim 18 further comprising a storage device for storing information regarding the lay person and the product.

46. A method allowing a lay person to record symptomatic problems and to generate a chart of symptoms relating to a product, the chart for use by a service provider in servicing the product; the method comprising the steps of:

5 initially querying a lay person for symptomatic information relating to a product;

receiving an initial response from the lay person related to the initial query;

10 generating a next query to the lay person based upon the received initial response, the next query relating to categories of symptoms that are sensed by the lay person using at least one of the five human senses;

receiving a next response from the lay person relating to the next query;

15 determining whether additional information is necessary relating to the product;

when additional information is necessary, repeating the generating step and the receiving step;

when additional information is not necessary, compiling the
20 initial response and all next responses received from the lay person;
and

outputting a chart of symptoms relating to the product based
upon the compiling step, the standardized chart for use by a service
provider;

25 the chart having sufficient information therein to minimize or
eliminate further communication between the lay person and the
service provider prior to the service provider servicing the product.

47. A method according to claim 46 wherein the generating
step includes the step of generating a menu based query that
categorizes symptoms of the product based on symptoms that the lay
person senses using at least one of the five human senses.

48. A method according to claim 46 wherein the generating
step includes the step of generating at least one pictorial representation
of the product.

49. A method according to claim 48 wherein the receiving
step includes the step of receiving the next response based upon the lay
person touching the at least one pictorial representation of the product.

50. A method according to claim 46 further comprising the
step of:

providing the standardized chart to the lay person; and

5 instructing the lay person to how to deposit the product with the
service provider and how to thereafter claim the product from the
service provider.

51. A method according to claim 50 further comprising the step of:

capturing a signature of the lay person to provide authorization for the service provider to the service provider.

52. A computer program product comprising:

computer usable medium having computer readable code embodied therein, the computer usable medium comprising:

5 a querying module configured to generate an initial query to a lay person for information regarding symptoms of a product;

the querying module further configured to generate at least one next query regarding symptoms of the product based upon a response received from the lay person to the initial query;

10 a receiving module configured to receive a response from the lay person to the initial query and to receive a response from the lay person to the at least one next query;

a compiling module configured to compile responses received from the lay person, including symptomatic information received from the lay person within the responses; and

15 an outputting module configured to output a chart of symptoms relating to the product based upon the compiled responses, the chart for use by a service provider;

the chart containing sufficient symptomatic information to enable the service provider to service the product with minimal additional
20 communication between the service provider and the lay person.

53. A computer program product according to claim 52 wherein the querying module is further configured to generate menu based queries that categorize symptoms of the product based upon symptoms that the lay person senses using at least one of the five senses.

54. A computer program product according to claim 52 further comprising:

a graphics module configured to generate at least one pictorial representation of the product.

55. A computer program product according to claim 52 further comprising:

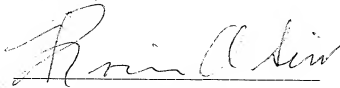
an internet module configured to establish internet connections. --

REMARKS

This Preliminary Amendment (1) conforms the drawings and the specification of present continuation application to the allowed form of its parent and now-allowed application Serial No. 09/122,404, and (2) presents new claims that are believed to more clearly define the broad scope of the present invention.

Signed this 4 day of June 2001.

Respectfully submitted.

A handwritten signature in dark ink, appearing to read "Francis A. Sirr", is written over a horizontal line.

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1011502268860

VERSION WITH MARKINGS SHOWING CHANGES MADE

In the Specification:

Paragraphs beginning at page 1, lines 4 through 15 have been amended as follows:

The present invention relates generally to interactive computerized systems and methods for obtaining and processing information. More particularly, the present invention pertains to an interactive system and method for receiving information regarding a customer, the equipment, such as an automobile, a tractor and/or trailer, a fork lift, cherry picker or front loader, and the [service or repairs it needs] symptomatic problems that prompt the need for service or repairs, and the processing of this information to generate work and parts orders for the customer, [parts. Supplier(s) and mechanic], the supplier(s), and service personal. The invention further pertains to the optional transmission of work completion data to accounting and/or quality control subsystems. While the invention is usable for servicing a variety of equipment, it will be primarily described here in terms of automobiles because the description of this example addresses most, if [hot] not all, of the problems relative to a large repair shop for such equipment.

Paragraphs beginning at page 2, lines 10 through 22 and page 3 lines 1 through 2 have been amended as follows:

The present invention provides an interactive, user-friendly- [diagnostic] symptomatic recording system for the driver or other equipment deliverer. The customer can answer basic Menu-driven queries and/or prompts and the system will prepare and transmit to the repair center a preliminary [diagnostic report such as] symptomatic report including the symptom or symptoms that prompted the need for repair as well as the frequency of occurrence. For example the problem could be hard starting in the cold [-]

that has never happened before. The system is particularly useful for employment outside the normal operating hours of the repair facility.

Representative of the art is;

U.S. Patent No. 5,214,582, issued to Gray, teaches interactive diagnostic systems and methods for automotive vehicles of the type having networks [Of] of sensors and actuators for sensing and actuating various functions in the vehicle and onboard computers for monitoring sensors and controlling the actuators. An external computer is used to control selected actuators independent of the onboard computer and for simulating operation of selected sensors. At the same time, the electronic data entering and exiting the onboard computer is monitored and analyzed by the external computer for trouble shooting purposes.

Paragraphs beginning at page 5, lines 5 through 7, has been amended as follows:

One aspect of the present equipment service invention is to provide an efficient system and process for obtaining, recording and utilizing appropriate information about a vehicle and [its required] why it requires service from a customer.

Paragraphs beginning at page 6, lines 1 through 12, has been amended as follows:

Optionally, an input mechanism can be provided to transmit data upon completion of the work to an accounting module or subsystem to facilitate preparation of the [hill] bill and notification of the customer by the accounting department. Such data can also be transmitted to a quality control subsystem.

Further input and display mechanisms are provided for the mechanic, service representative, or lay person using the system to check and provide status information about the automobile's current service program. A data bank is provided to receive and maintain current status information on work assignments being performed for customers and cars. Interactive communication units are provided to originate and receive calls to and from customers regarding the status of the work assignments on their cars. Interactive communication units are also provided to initiate and execute orders for service, supplies, and parts from dealer stock or external providers.

Paragraphs beginning at page 7, lines 1 through 3, has been amended as follows:

Further, an interactive computerized process is provided for receiving customer inputs for compiling and summarizing those inputs, and developing work orders for service personal and non-lay person technicians identifying the symptomatic problems that prompted the lay person to seek automobile repair and maintenance. This is accomplished by steps including!

Paragraphs beginning at page 10, lines 12 through 22, has been amended as follows:

FIGS. 1 and 2 provide an overview of the systems and methods of the invention. [FIG. 1] FIG. 1 is a system overview of the invention. A customer brings an automobile to the repair center where customer interacts with customer interview terminal screen 10. This console can include a portable personal computer or, at least, a freestanding terminal serving a master computer. It comprises input means and interactive display means, preferably a touch-active CRT screen such as disclosed in U.S. Patents Nos. 4,449,186; 5,404,443; 5,488,575- 5,499,707; 5,537,315 and 5,539,429 incorporated herein by reference. Such touch-active screens preferably incorporate audio output means, as disclosed in U.S. Patent No. 4,449,186. The system is

designed so that the hardware and software cooperate to provide convenient means for the customer to provide the necessary symptomatic information.

Paragraphs beginning at pages 11, lines 1 through 22, 12, lines 1 through 22, and 13, lines 1 through 5 through as been amended as follows:

Preferably, most information will be provided via the touch-active screen in response to a menu-driven series of queries or prompts[.]. Some of the input information (i.e., vehicle and customer ID, credit card payment information, and the like) can be provided by inserting to the card reader 20 a credit card, or other identity card issued by the repair center to minimize effort on the part of the customer and errors as well. Such cards can be used to unlock and provide access to the console and other input devices to minimize vandalism or other unauthorized activities[.]. Alternatively, systems can be used which automatically sense the vehicle's ID and/or the condition of the vehicle systems such as, for example, an optical/magnetic reader 40, see e.g., U.S. Patent No. 5,058,044. To augment the preferred touch-active screens, a standard or simplified alphanumeric keyboard 30 can be provided, and optionally provisions can be made for the customer to dictate into the input system using devices such as the voice-activated system disclosed in U.S. Patent no. 5,586,037.

In addition to the Customer's direct input of ID data, observed symptoms, and requests at this intake transaction, customer may be assisted by a service advisor or other representative of the repair center. Such representatives may enter information at the console 10, and/or use a hand-held device such as disclosed above. Optionally, readings may be taken from the vehicle's onboard computer 50 at this point using [d] a hand-held unit or other computerized monitor. In this way, the error codes from the onboard computer can be read, analyzed, and considered in writing up the service order. This will normally be available only if the customer is willing to wait and there is a repair center representative available to take the readings unless

an automatic sensor system is used as in U.S. Patent No. 5,557,268. A service advisor may introduce information into the system via console 10, either during the customer's intake transaction or thereafter. Preferably, the service advisor will employ a hand-held unit incorporating the functions of console 10

The console displays menus, queries, prompts and input/output data on the CRT screen, and upon command or completion of the transaction prints out materials via printer [40] 90, or other similar printers that could be attached to the system at one of the input devices or networked to computing device 70, for the customer's use[.] .

The information inputs all enter a [central processing unit (CPU) 70] computing device 70 that could include a programmed computer, as shown, having a central processing unit (CPU), a device having firmware embedded into microchips, a general personal computer having specialized application programming, etc. component. [of a computer where they are analyzed and correlated] The information entered into the computing device 70 is analyzed, summarized, compiled, and correlated. The system may query the customer further to develop the input information fully before closing the transaction. When the initial information is obtained, the system prepares a service order that includes a standardized reporting of the symptomatic problems that prompted the lay person to seek repairs. The present invention could be combined with a diagnostic service program that outputs a service need in the order, if the needed service and/or repairs are clear. [If] More typically, however, more information is needed to determine the [Service] service required, therefore, the system can print out and display a [proposed service order] standardized summary of the symptomatic problems containing queries for the mechanic and/or service advisor to analyze. The service mission is subject to change after readings have been taken from the vehicle's onboard computer.

A finished service order will be transmitted to mechanic, service representative, technician, or other professional via printer 90 and/or console, which displays the order on a CRT screen. Using similar input means to those described for console 10, the mechanic can submit information to modify the service order, query the service advisor as to what work is approved, and advise the system when the job is completed or delayed. Such inputs will be transmitted to [CPU] computing device 70 which stores and processes [them, Events] them, Events including job completion or delay are transmitted via suitable communications media, such as the telephone, facsimile, or e-mail, to the customer using customer notification programs. Additionally, in the process of the job, the [CPU] computing device 70 can be used to optionally identify and order materials, spare parts and the like for the service using ordering program.

Paragraphs beginning at page 14, lines 1 through 22, and page 15, lines 1 through 11, has been amended as follows:

(4), Brakes (5), Steering/suspension (6) Power accessories/electrical (7), and Other services (8) subcategories. These categories are supplemented (See Fig. [32] 33) for vehicles more complex than automobiles, e.g., a Peterbilt truck, and vehicle-based equipment, e.g., a cherry picker and a front loader. Each of these menu choices leads to subroutines containing multiple menu choices to guide the customer through an interrogation process which will identify the symptomatic problems to be corrected and/or routine services to be performed. Exemplary flow diagrams for these subcategories are provided in subsequent figures discussed below. Upon completion of any of the subroutines [I] 1 through 8, the display shifts to a "General Questions" subroutine 130 which queries the customer as to how often the problem occurs and similar questions. After responding to these queries, the customer is queried as to whether there are additional vehicle problems 135; if "yes", the program reverts to the main menu for further choices. Selection of the

"other services" menu 140 provides options for choosing various maintenance services as well as a "Help" option which refers the customer to the service advisor as shown at 145.

Upon completion of the interrogation via the categorical subroutines, the customer is automatically transferred to "Additional Services" subroutine 150, which offers further choices discussed below for routine service operations and the like. [When the customer has finished with this-subroutine, customer is transferred to an additional services menu 150 which offers additional service options.] Once the customer exits this menu, customer is transferred to subroutine 155 which uses Boolean and other processing logic to provide a compilation of the symptoms and requested service items and displays the compilation along with a menu of additional accessories or services which can be purchased. Following this, subroutine 160 provides a cost estimate of any requested maintenance services, and subroutine 165 provides a cost estimate of repair costs and pickup time. The repair/work order is presented by subroutine 170, and the customer's electronic signature is captured. On signature of the repair order, instructions for leaving the key(s) in a secure depository are shown at 173. Subroutine 175 then queries whether the customer will wait for the vehicle, drop it off, or request a loaner vehicle. [This subroutine] Subroutine 175 also queries the customer's requests with regard to the disposition of the used parts. Finally, the finished repair estimate is displayed and printed out for both the customer, service advisor and the mechanic, technician, or other professional service provider at 180.

Paragraph beginning at page 16, lines 1 through 10, has been amended as follows:

services" menu 360. Since the customer chooses no additional services, the system [analyzes] compiles and summarizes the symptoms and any requested maintenance services at 365 and presents the customer with a menu of additional merchandise and services which can be purchased. Subroutine 370 presents the customer with the estimated maintenance costs (if any), and subroutine 375 presents a statement of estimated repair costs and pickup time. The system then captures the customer's signature 380, queries as to whether customer will wait or drop off the vehicle 385 with the repair organization, whether a loaner is required, and whether parts are to be returned as shown in block 385. Finally, the finished repair order is displayed and printed for both customer and mechanic at 390. The system resets for the next customer at 395.

Paragraphs beginning at page 17, lines 1 through 17, have been amended as follows:

FIG. 5 illustrates the menu choices for "Noise/vibrations" (Category 2). The initial menu allows the customer to select noises or vibrations alone or a combination of both[,]. Whatever the choice, the customer will be queried as to what the nature of the symptoms are, when they occur and where the symptom occurs. Input from the service computer can be provided to assist in the analysis. Finally, the customer is queried as to "how often" the symptoms occur. At this point, the computer advances to "Additional Vehicles Problems" 135.

FIG. 6. [Illustrates] illustrates menu choices for a "Automatic/manual/4-wheel drive" transmission check (Category 3). The initial menu requires selection as to automatic or manual transmissions or the 4-wheel drive. Once a selection is made, the customer is queried as to the nature of the symptoms and when they occur. [These] After these questions are answered, the customer is queried as to how often the symptoms occur. After all these questions are answered for a subcategory, the customer is

queried as to whether there are problems in another subcategory. If not, the system moves to the closing sequence. If the customer indicates that there are problems in another subcategory, (e.g., problems with the 4-wheel drive in addition to the transmission), the computer returns to the main menu 125 for another selection.

Paragraphs beginning at page 18, lines 10 through 16, have been amended as follows:

FIG. 9 illustrates the menu choices for "Steering/Suspension" (Category 6). The initial menu choices are for steering or suspension problems, and after making a selection, the customer is called upon to describe the nature of the symptoms, when they occur, and how often they occur[.] After these questions are answered, the customer is queried whether there are any symptoms in the other subcategory (e.g., suspension in addition to steering). If not, customer is returned to the main menu or passed through the closing sequence.

Paragraph beginning at page 19, lines 20 through 22 and page 20, lines 1 through 4, has been amended as follows:

FIGS. 12A and 12B illustrate computer screens which relate to information obtained by optic, magnetic or rf (including microwave) scanning. As shown in FIGS. 12B and 12C, information may also be input through touch screen technology or other input means, not specifically shown. FIGS. 12C-12D illustrate screens which enable the customer to input personal information. FIGS. 12E and 12F are illustrative of screens enabling the customer to input "Mileage" by pressing a "change" designator to bring up a numeric keypad. FIG. 12G similarly enables the customer to enter a telephone number for contact during the period the car is in the shop. An illustrative keypad screen is omitted.

Paragraph beginning at page 20, lines 8 through 13, has been amended as follows:

FIGS. 14A to [14E] 14D illustrate computer monitor screens for the "Category 1" program. FIG. 14A identifies the category and asks for the selection of "Symptoms." FIG. 14B illustrates a screen for "Symptoms when starting." FIG. 14C illustrates the screen for "When do you notice it", i.e., the questions about the nature and frequency of the symptoms. FIG. 14D illustrates the screen querying the customer regarding "Symptoms when driving".

Paragraph beginning at page 22, lines 21 through 22, and page 23, lines 1 through 17, has been amended as follows:

FIGS. 21A to [21L] 21S illustrate selected computer screens for the "Other services" program. FIG. 21A illustrates a screen for "Other services available" offering menu choices for scheduled and unscheduled maintenance, vehicle exterior and interior, special order parts and recall notices, new- or used-car internal and general symptoms. FIG. 21B illustrates a screen for "[Unscheduled] Scheduled maintenance" and FIG. 21C illustrates a screen for "Unscheduled maintenance." FIG. [21C] 21D illustrates a screen for "Vehicle exterior" subcategory including questions regarding the area(s) in which the problem is occurring. [FIG 21 D provides] FIGS. 21E – 21I provide problem location selections. FIG. 21 E illustrates a screen requesting information on the problem [description] location. The FIG. 21 F illustrates a screen for locating a problem on the vehicle exterior via a diagram. FIG. 21 G illustrates a computer screen for the "Vehicle interior" subcategory, including questions regarding the area where the problem is occurring. FIG. 21 H illustrates a screen for the "Problem location" subcategory of "Vehicle interior lighting". FIG. 21 I is illustrative of a screen for locating problems via a diagram. FIG. 21 J illustrates a screen for describing the problem [in the vehicle interior]. FIG. 21 K illustrates a screen for information regarding a special order or

recall notice. FIG. 21L illustrates the screen for a "new car" or used car" internal repair order. FIGS. 21M - 21S illustrate screens for identifying things the customer sees, hears, smells and feels under the "help" category 140 of FIG. 2 and asks "When" and "Where."

Paragraph beginning at page 25, lines 6 through 20, has been amended as follows:

Input mechanisms can include conventional keyboards and/or keypads, interactive touch screens, and screens with icons, such as graphical user interfaces, that are responsive to input devices, such as a "mouse", optical and magnetic readers, and data input ports. Preferably the input mechanisms include touch-active display screens as discussed in detail below. Such screens permit interaction between a user and the computer in response to the users touching the screen with an object such as a finger or a pointing device. As disclosed in U.S. Patent No. 5,537,315, such pointing devices can include a light pen, sonic pen, voltage pencil, stick, or wand. Other input mechanisms to the system, if not directly to the computer, will include smart card devices, such as conventional credit card readers, for receiving data about the customer and/or vehicle to be serviced, plus payment information such as credit card numbers. One suitable credit card reader is disclosed in U.S. Patent No. 4,449,186, column 1. Optionally, the input mechanisms can include a voice-activated system, such as a digitized voice recognition system for receiving user input, such as those pioneered by Dragon Systems, Inc., San Rafael, California.

Paragraph beginning at page 28, lines 1 through 3, has been amended as follows

previous categories and will provide feedback subroutines necessary to handle vehicles other than automobiles and mechanical equipment for grading, lifting, moving, etc., various items and/or products. [.]